REMARKS

I. Status of the Claims

Claims 12-14 are pending, claims 15-31 having been withdrawn from consideration.

II. Information Disclosure Statement - Document No. DE 1913910

In response to the Examiner's request, Applicant resubmits prior art reference DE 1913910.

III. Claim 14, As Amended, Complies With §112

On page 3 of the Action, the Examiner rejects claim 14 under 35 U.S.C. § 112.

Claim 14 has been amended to overcome the Examiner's rejection.

IV. Claims 12-14, As Amended, Are Not Anticipated By Fuchs

On pages 4-5 of the Action, the Examiner rejects claims 12-14 under 35 U.S.C. §102 as being anticipated by Fuchs (DE 1903437). The Examiner states that Fuchs shows a brake caliper in Figure 1 having a caliper wall, the caliper wall defining a cylinder 1 with at least one axially displaceable, hydraulically actuated piston 2 received in the cylinder, with which a brake pad 8, 9 can be pressed against a brake disc 10, the piston defining a cavity 4 therewithin, with at least one inlet opening for feeding a cooling medium into the cavity, the inlet opening being arranged in the piston spaced away from the brake pad, and at least one outlet opening arranged in the piston adjacent to the brake pad for discharging cooling medium from the cavity, as marked below, characterized in that a flow through device, as marked below, extends from the caliper wall into the interior space o the piston to allow passage of cooling medium from outside the caliper wall to the cavity, as shown.

Applicant respectfully submits that, contrary to the Examiner's statement, the chamber at the head of the piston of the Fuchs device is not an outlet opening. Rather, the outlet in the Fuchs piston is in the wall of the piston from which a pipe extends to carry the liquid cooling medium away from the piston distant from the brake pad. Applicant's claim 12, on the other hand, calls for an "outlet opening arranged in the piston adjacent the brake pad". Such structure is not disclosed by Fuchs and, thus, claim 12 is patentable over the cited art.

Additionally, to further distinguish over Fuchs, Applicant has amended claim 12 to call for the outlet opening to be arranged to discharge air from the cavity to adjacent the brake pad. Such an outlet opening is not present in Fuchs. To the contrary, the Fuch's device discharges a liquid cooling medium at a location distant from the brake pad.

In Applicant's claimed device, air is funneled into the inside of the piston and exhausted adjacent the brake pad. As a result, the brake fluid acting on the piston is cooled by the action of the air at the point where overheated brake fluid presents the biggest problem. Consequently, there is a localizing of the cooling effect. Further, the heat removed from the brake fluid by the cooling air is then exhausted to atmosphere via the outlets adjacent the brake pad, thereby also cooling the surface of the brake pad as the air escapes. Applicant's claimed structure does not deal with hot cooling fluid or the associated problems.

In Fuchs, the heated cooling fluid escaping from the piston presently is cooled by a separate heat transfer arrangement, reducing the cooling efficiency. The arrangement in Fuchs operates entirely differently from Applicant's claimed structure. In Fuchs, the area where cooling of the brake fluid is most necessary is in the area behind the seal between the piston and the cylinder. The cold cooling liquid passes into the body of the piston via the lower pipe in Fig. 1, cooling the piston body as it circulates through the gallery number 4. The heated cooling fluid is then passed back out of the piston via the upper pipe. This has the effect of locally heating the brake fluid in the region around that pipe. A further advantage of the presently claimed invention over the Fuchs invention is the "one way" nature of the cooling air flow, cold cooling air flows into the piston cavity at the caliper side, removing heat locally from the brake fluid. The cooling air which is now heated by removal of the heat from the brake fluid passes out of the piston adjacent the brake pad and continues to cool the braking system by flowing over the brake pad as it exits the piston cavity.

Looking at Fig. 1 of Fuchs, one can see the brake disc 10, the brake pad 8, 9, the piston 2 sliding in a piston cylinder. At peak braking load, the surface temperature of a carbon fibre disc can reach 1200O Celsius. The brake pad 8, 9 may reach 700-800O Celsius and the end of the piston 2 may reach 600-700O Celsius. The boiling point of brake fluid tends to be approximately 270O Celsius and temperatures of 230O Celsius can affect the performance of the braking system. If one considers the Fuchs arrangement in Fig. 1, cold cooling fluid passes through the lower pipe into the lower gallery 4 and starts to be heated by the body of the piston. The fluid passes into the gallery 4

at the end of the piston 2 where the piston is considerably hotter (approximately 600O Celsius). The cooling fluid then passes out of the gallery 4 into the upper pipe where it passes through the brake fluid at temperature 200O Celsius. There is a significant risk in this arrangement that the cooling fluid, by passing through the high temperature area of the piston body 2, will attain a temperature higher than the operating temperature of the brake fluid or at least with insufficient temperature differential to cool the brake fluid effectively. In the claimed arrangement, cold cooling air enters the piston cavity and, at its coldest, encounters the coolest part of the piston. As it is heated by the cooler part of the piston it passes towards the warmer part of the piston, meaning that the temperature differential between the cooling air and the surface over which it is flowing is maintained. Even though the cooling air has been heated by the piston body, by the time that it exits the piston it is flowing over the brake pad which, again, is hotter still than the now heated cooling air. It would not be obvious to the skilled person in Fuchs to provide the "one way" arrangement since Fuchs uses a cooling liquid with a reservoir and a separate heat transfer mechanism. Merely replacing the cooling liquid in Fuchs and exhausting the air to atmosphere rather than to a heat transfer mechanism would not provide the same level of cooling effect for the reasons stated above, namely that heated cooling air passes back through the brake fluid in Fig. 1 of Fuchs. Only by using cooling air and providing the "one way" flow through the brake system can the advantageous cooling arrangement of the claimed invention be achieved.

Accordingly, claims 12-14, as amended, are patentable over Fuchs.

VI. Cortanze Is Not Prior Art

On page 6 of the Action, the Examiner rejects claims 12-14 under 35 U.S.C. §102(a) as being anticipated by Cortanze (DE 10034364 A1). Applicant respectfully submits, however, that Cortanze is not prior art under §102(a).

Title 35 U.S.C. 102(a) provides that "a person shall be entitled to a patent unless the invention was known or used by others in this country or patented or described in the printed publication in this or a foreign country before the invention thereof by the applicant for a patent". In this case, the present application has an international filing date of January 14, 2002. The Cortanze patent application was published in Germany on 7 February 2002. Thus, the patent application of Cortanze does not predate Applicant's filing date.

As such, the Cortanze is not prior art under §102(a) and therefore the Applicant respectfully requests reconsideration of this rejection.

V. Conclusion

Applicant respectfully requests that the pending claims be allowed. If a telephone interview will clarify some of the issues and expedite the prosecution, the applicant welcomes the examiner to contact the applicant's representative at 312-214-8329.

No other fees are believed due at this time, however, please charge any additional deficiencies or credit any overpayments to deposit account number 12-0913 with reference to our attorney docket number (37742/97114).

Respectfully submitted,

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